

## REMARKS

Reconsideration is respectfully requested in light of the foregoing amendments and remarks which follow. Entry of the amendment is respectfully requested. The amendment meets one or more of the criteria set forth in Rule 116. No new matter is introduced and the issues on appeal would be reduced by its entry.

Claims 1-8 are before the Examiner. By this response, claim 9 is amended. No new matter is believed to have been introduced.

Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Applicants respectfully traverse.

Claim 9 has been amended to address the point raised by the Examiner and is supported by the portion of the specification identified in the Office Action.

Reconsideration is requested.

Claim 5 is rejected under 35 U.S.C. 112, fourth paragraph, as being of improper dependent form for failing to further limit the subject of a previous claim. Applicants respectfully traverse.

The position taken by the Examiner has been considered. While it is noted that “bulk density” is a property of powders, granules and other “divided” solids and reflects the mass of many particles. It is submitted that it is a term of art and therefore would be understood, especially when read in light of the specification.

Also, as of August 18, 2011, the term “bulk density” and “silica” appear in the claims, including dependent claims, of some 523 patents and in the claims of 15 patents that additionally include “pyrogenic”, e.g. US 5,064,894 (claim 8).

Claim 5 further limits claim 1, by reciting an additional characteristic.

Reconsideration is requested.

Claims 1-3 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azechi et al (U.S. 6,331,558) in view of Scholz et al. (U.S. 2003/0195290). Applicants respectfully traverse.

On page 6 of the specification starting at line 12, it is stated that when the low-structure pyrogenic silica is introduced into silicone rubber, entirely novel properties result.

The experimental work reported, in the specification, establishes the presence of the properties in the rubber. The properties include: lower viscosities in the liquid silicone compared to the hydrophobic pyrogenic educt; no yield points; markedly higher tear resistance; and energy handling advantages. See page 11 of the specification starting at line 3.

Attention should be given to the comparative showing which correlates one or more of the advantages to a particular part of the inventive silica filler. Table 2 (preparation) and Table 3 (physiochemical data) are instructive as to the general character of the inventive filler. Consider the comparative silica described in Table 3. The properties contrasted include: compacted bulk density, loss on ignition, pH, and C content percentage. All the DBP values are consistent with “low” structure. The BET value of the “comparative silica” finds comparable values with some of the Sil 1-11 products. Table 2 reports SM mixtures for the Sil 1-11 products. Tables 5 (viscosity) and 6 (physiochemical properties) report the novel properties for the inventors’ silicone rubber product.

Applicants submit that the behavior/distinctive properties of the inventive silicone rubber would not have been evident from the combination of the Azechi et al. and Scholz et al. patent documents. There is clearly no recognition of the importance of the vinyl group on the surface of the destructured pyrogenic silica or the role of the “low” structure of the silica.

To highlight the inventive contribution, Applicants have included with this response Technical Bulletin Pigments No. 12 “Degussa-Silicas for HTV-Silicone Rubber” and Technical Information (TI) disclosures, identified below. Distinctive behaviors are shown and discussed in Bulletin No. 12 for a range of synthetic silicas. See sections 2.1 through 2.2.2. The discussion of

reinforcing properties provided in section 4 clearly indicates that the reinforcing effect of silica has been examined thoroughly and is based on the interaction between the silica finely divided particles and between the silica particles and the polymer matrix. Table 3 lists those studies. Compacted AEROSIL (“V grades”) is discussed in section 5.2. What is clear from the Bulletin is there is unpredictability and that a mere mention of a possible “use” is not the same as disclosure of unique properties.

Technical Information (TI) 1253 “AEROSIL and AEROXIDE for Liquid Silicone Rubber (LSR/LMS)”, Technical Information (TI) 1349 “Structural Modified AEROSIL for the Silicone Industry” and Technical Information (TI) 1209 “AEOSIL R8200 for Silicone Rubber” provide additional background information which highlights the inventive contribution of the claimed silicone rubber product. TI 1349 shows a distinct “low” structure pyrogenic silica product relative to that used in the claimed silicone rubber products. TI 1253 discusses another low structure product, AEROSIL R 8200 (high tapped density, low BET, very hydrophobic (trimethylsilyl groups anchored to surface)). See page 10. Table 2 (page 11) discloses rheological properties of uncured LSR product which are distinct from those taught here. Table 3 (page 13) discloses mechanical properties for LSR vulcanisates containing AEROSIL R 8200 which are also distinct from those disclosed here. The presence of the vinyl group improves tear resistance at a lower concentration. The destructure improves viscosity. Consider TI 1209 in that regard.

The Bulletins and Technical Information establish there is a range of factors which influence the interplay between the filler components and the silicone rubber in terms of resultant properties.

The present invention focuses on the interplay of vinyl and hydrophobic groups and destructured (compacted) pyrogenic silica on properties. Claim 1 describes a high tear propagation resistant silicone rubber containing as a reinforcing filler: silanized structurally modified pyrogenic silica, characterized by both vinyl groups fixed and hydrophobic groups -- methyl silyl groups fixed to the silica surface area. The surface has a BET value between 10 and

1000 m.<sup>2</sup>/g. The structurally modified silica has a DBP value % < 200 or not determinable. The presence of both the vinyl and methyl groups are evident in Sil 3, 7 and 11 (examples 1-3). (Compare to AEROSIL R 8200 results in Bulletin above). The “destructuring” is absent in the comparative silica (See present Table 1). It would be fair and reasonable, from the evidence provided, to attribute the inventive silicone rubber properties to the presence of both the vinyl and hydrophobic groups on the silica surface and destructuring (“low” pyrogenic silica structure) of the underlying pyrogenic silica core.

The Alzechi et al. patent has been considered. There is no recognition of the importance of a vinyl group affixed to the surface of a silica reinforcing filler and a silicone rubber having high tear propagation resistance. There is no recognition of the need for the presence of both the vinyl group and the hydrophobic affixed to the silica surface for a silicone rubber having high tear propagation resistance. The presence of an inherent characteristic is not established by speculation. Its presence must be established by facts establishing its presence with reasonable certainty. That has not been done.

There is no mention of destructured pyrogenic silica. There is no recognition that surface modified destructured pyrogenic silica filler imparts to a silicone rubber product reduced viscosity. Again the presence of an inherent characteristic is not established by speculation. Its presence must be established by facts establishing its presence with reasonable certainty. That has not been done.

Alzechi et al. do teach a hydrophobized silica fine. This is produced by a coating process. The C percentage amounts are consistent with a coating process. It is not clear that such a process results in the silyl groups being affixed- covalent bond attachment. Applicants employ conditions distinct from those taught in Alzechi et al. to affix their vinyl and methyl groups. Again the presence of an inherent characteristic is not established by speculation. Its presence must be established by facts establishing its presence with reasonable certainty. That has not been done.

The Scholz et al. patent has been considered. Scholz et al. do teach silicone rubber mixtures containing structure-modified hydrophobic pyrogenic silica. Scholz et al. do not recognize the role of a vinyl group relative to the property taught by applicants. Scholz et al. clearly shows dimethylsilyl affixed groups. See, e.g., Table 1. Table 4 discusses rheological properties.

It is not seen how Scholz et al. addresses all of the deficiencies of Azechi et al.

Reconsideration is respectfully requested. Even should the Examiner remain of the opinion that a *prima facie* case has been established, please consider the results shown in the specification as establishing results not expected from the art relied upon. The Scholz et al. product is more akin to that discussed in TI 1209 and TI 1253 (AEROSIL 8200), which the present invention represents an improvement thereover.

Claims 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Azechi et al (U.S. 6,331,558) in view of Scholz et al. (U.S. 2003/0195290) as applied to claim 1 above, further in view of Kobayashi et al. (US 2002/0077412). Applicants respectfully traverse.

Azechi et al. and Scholz et al. are discussed above. It is submitted that the deficiencies noted above are not remedied by the teachings of Kobayashi et al.

Kobayashi et al. teach a six component water repellent silicone coating agent composition. One of the components is a hydrophobic surface treated dry process silica having a carbon content of 3.7 to 5% by weight and a bulk density of 40 to 99 g/L, or a hydrophobic surface treated dry process silica having a carbon content of 2.7 to 5% by weight and a bulk density of 100 to 300 g/L. The silica is not identified as pyrogenic, destructured or densified. No DBP values are given. The silica filler described in the claims is not taught.

Further, present Table 3 shows the influence of the structural modification on bulk density. There is a dramatic increase from 48 g/l for the comparative example to 132-266 g/l for

Sil 1-11 while the BET surface area remains in the same order of magnitude. Therefore, the bulk density is a significant limitation to claim 1.

Further, bulk density is a common value to characterize powders (similar meaning as apparent density/powder density), which is not limited to bulk material.

Regarding Azechi, Applicants submit the following table which compares Azechi's silicon rubber composition and the present invention. Applicants have recalculated the corresponding values from Table 1 (Azechi) and Tables 5-6 (present invention) to have the same units.

	Factor	Azechi	Scholz (present invention) 20% silica
Hardness		40-44 (JIS K- 6301)	41-45 (Shore A)
Elongation [%]	-	450-520	290-350
Tensile strength [N/mm <sup>2</sup> ]	1 kgf/cm <sup>2</sup> = 0.0981 N/mm <sup>2</sup>	6.4-7.1	4.0-5.5
Viscosity [Pa*s] initial Viscosity [Pa*s] 5 days	1 Poise = 0.1 Pa*s	300-350 600-1000	51-55 -

As can be seen, the hardness gives equivalent values. Elongation, tensile strength and especially viscosity of the present invention are lower than the values of Azechi's composition. Applicants indicate that for a skilled person in the art, hardness and viscosity are the relevant values to compare silicon rubbers. However, while the hardness values are similar, the viscosity

values significantly differ. The low viscosity of the present invention is due to the structural modification and is an advantageous feature for injection molding. Therefore, Applicants believe that the invention involves an inventive step.

Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1-3 and 6-8 are rejected on the ground of non-statutory obviousness type double patenting as being unpatentable over claim 3 of U.S. Patent No. 7,563,839 ('839) in view of Azechi et al. (US 6,331,558). Applicants respectfully traverse.

The generic nature of claim 3 is noted. It remains applicants' opinion that the species represented by the present claims is not suggested, especially considering paucity of Azechi et al. teachings. Applicants have enclosed a terminal disclaimer. The rejection is obviated.

Its withdrawal is requested.

#### **Request for Interview**

Applicants respectfully request either a telephonic or an in-person interview should there be any remaining issues.

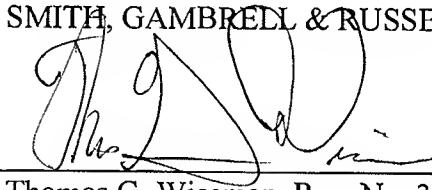
## CONCLUSION

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Therefore, it is respectfully requested that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. However, in the event that additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. 1.136(a), and any fees required therefore are hereby authorized to be charged to **Deposit Account No. 02-4300, Attorney Docket No. 032301.592**.

Respectfully submitted,

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